Rejection Under 35 U.S.C. 112, First Paragraph

Claims 1-22 and 54 are rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. The Office Action essentially states that the specification does not support or disclose extracting the watermark or encoding the chrominance bits automatically.

This ground of rejection is respectfully traversed for the following reason.

The word "automatically" was inserted into the claims to simply clarify that the methods are performed by a machine, e.g., a receiver or a transmitter, and not by a person. Note that the specification a) discloses in FIG. 1 an exemplary transmitter for digital watermarking a video signal, in accordance with the principles of the invention, and b) discloses in FIG. 2 an exemplary receiver for recovering the additional data of a video signal containing digital watermarking on the chrominance signal thereof, in accordance with the principles of the invention. Thus, since there is a machine, i.e., the exemplary transmitter, disclosed in the specification, for performing the encoding and there is a machine, i.e., the exemplary receiver, disclosed in the specification, for performing the decoding, there is support in the specification for automatically performing the methods claimed, e.g., when the methods are performed, as disclosed, by a machine and not by a human. As a result, claims 1-22 and 54 comply with the written description requirement and meet the requirements of 35 U.S.C. 112, first paragraph.

Note that the claims of United States Patent No. 7,646,881, issued to applicant, were similarly amended and clearly sufficient support was found to be present in the specification.

Rejection Under 35 U.S.C. 102

Claims 1-9, 11, 13-18, 20-32, 34-37, 53-54 and 57 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 6,590,996 issued to Reed et al. on July 8, 2003.

This ground of rejection is respectfully avoided for the following reasons.

In response to applicant's prior arguments, the Office Action states that Reed et al., in column 38, lines 20-24, "discloses that color channels to which the watermark is applied are altered depending on a characteristic color of an image block to be

transformed to transform coefficient for watermark encoding, which can be computed as an average of the color for that block". Therefore, concludes the Office Action, the method of Reed et al., "is to modify to effect the desired changes to the image, so it is readily apparent that only selected bits of the color block image will be used". The Office Action continues, stating: "If the invention uses all the bits, it will not obtain the desired changes to the image". The Office Action further states that, "the characteristic of color is computed as an average of the transform coefficients for watermarking encoding" and "[i]n other words, the transform coefficients are bits, and the average has to be the average values of these transform coefficients".

To the best applicant can understand the position of the Office Action, as the language and reasoning is rather unclear, and given what is actually taught by Reed et al., applicant believes that his previous position is correct and that Reed et al. does **not** teach applicant's invention as claimed. In this regard, please note the following additional points.

It appears that the Office Action has misconstrued the meaning of applicant's claims and the teaching of the Reed et al. reference. First, the Office Action appears to have confused "**chrominance**", which is a specific, well-known term in video signals, with the color components or channels of an image. The lines of Reed et al. cited by the Office Action, and indeed the entire section from column 37, line 63 through column 38, line 51, are discussing color components, e.g., red (R), green (G), and blue (B), which are **not chrominance** components.

It is well-known that, as applied to video signals, luminance represents the brightness in an image i.e., the "black and white" or achromatic portion of the image. Thus, luminance represents the image without any color. This is the Y of the video signal when the video signal is represented using Y, U, and V. For color systems, luminance, Y, is often paired with **chrominance**, which represents the color information. Chrominance is the U and V of the color video signal represented using Y, U, and V.

More specifically, chrominance is usually represented as two color-difference components: U = B' – Y' (blue – luma) and V = R' – Y' (red – luma). In composite video signals, the U and V signals modulate a color subcarrier signal, and the result is referred

to as the chrominance signal; the phase and amplitude of this modulated chrominance signal correspond approximately to the hue and saturation of the color. Rearranging RGB color signals into luminance and chrominance allows the bandwidth of each to be determined separately. The idea of transmitting a color television signal with distinct luminance and chrominance components originated with Georges Valensi, who patented the idea in 1938. Valensi's patent application described: "(t)he use of two channels, one transmitting the predominating color (signal T), and the other the mean brilliance (signal t) output from a single television transmitter to be received not only by color television receivers provided with the necessary more expensive equipment, but also by the ordinary type of television receiver which is more numerous and less expensive and which reproduces the pictures in black and white only." Previous schemes for color television systems, which were incompatible with existing monochrome receivers, transmitted RGB signals in various ways.

Thus, applicant's claims, which relate to chrominance, are very different from the cited section of Reed et al., which relates to color channels, e.g., red (R), green (G), and blue (B).

Reed et al. discusses mapping a desired specified change to an image attribute which will indicate watermark data, the change being straightforwardly implementable by a change to the **color components** (apparently also referred to therein as color values and color channels), in a manner that will be difficult for a viewer to detect. Note that the color components mentioned in the cited section of Reed et al. are **not** the same as the recited chrominance component of applicants' claims. This is implicitly recognized in Reed et al. and confirmed by the fact that Reed et al. discusses a mapping scheme based on luminance and chrominance (which is very different from applicant's claimed invention), as opposed to color, in the immediately preceding section.

While it is true that the cited section Reed et al. talks about the characteristic color of a region, such characteristic color is **not** a **chrominance** of the region, **nor** is it the average value of the **chrominance** of the region. Furthermore, Reed et al. does **not** teach to modify this characteristic color. Rather, Reed et al. teaches to use the average color, which is also called the characteristic color, of the region to look up in a table which of

the color channels should be modified to implement the desired changes in the image. (See Reed et al., column 38, lines 14-24 and 30-39.)

Applicant recognizes that Reed et al. points out that the characteristic color may be computed as average or DC component of the color for that block. However, the color of the block is **not** the same as the DC coefficient of a transform block for any particular color of the block. Rather, it is the average of all the colors in the entire block.

Given the foregoing, it is clear that the Office Action's statement that "the characteristic of the color is computed as an average of the transform coefficients for watermarking encoding", is simply factually **incorrect** (as well as grammatically uncertain). The characteristic color, as noted above, is the average color over the entire block, and it is **not** determined by averaging the transform coefficients, **nor** could it be so calculated. Thus, the Office Action's statement that "the transform coefficients are bits, and the average has to be average values of these transform coefficients or bits", is likewise incorrect (as well as grammatically uncertain), but in any event it is clear that the average of the transform coefficients is **not** the DC value of the transform coefficients.

Furthermore, it is important to recognize that Reed et al. does **not** teach or suggest that it is the DC component of the color for the block, let alone any particular DC coefficient of the various color channels, that is to be modified. Rather, Reed et al. teaches the use of the average color, which is the characteristic of the block, to determine which color or colors, i.e., which color channels, are to be modified and that transform coefficients to encode a watermark can be targeted to specific color channels for each image block. In other words, there is **no** specific teaching or suggestion to modify the DC component or coefficient of a transform of any of the color channels to carry the watermark.

Furthermore, applicant suggests that modifying the DC component in an arrangement such as disclosed by Reed et al. could be counter productive, because the DC component is the characteristic color of the block, and it is that characteristic color of the block which is used in a receiver as the basis for the lookup to determine which color channels have been changed and are carrying the watermark data. However, if the DC component, i.e., the characteristic color, has been modified, the lookup will be altered,

and perhaps the wrong color channels will be identified as carrying the watermark data. If so, because such wrongly identified channels will **not** actually be carrying any watermark data, attempts to retrieve from them watermark data will result in errors. Thus, notwithstanding the Office Action's suggestion to the contrary, it appears that the cited section of Reed et al. actually teaches away from modifying the DC component, i.e., the characteristic color, of the block.

Additionally, applicant's claims, e.g., claim 1, require automatically impressing at least a portion of said additional information upon a chrominance portion of said video signal by **placing** it in at least one selected bit position of a value derived from an average of said chrominance portion over a block of said video signal. In other words, the actual portion of the additional information itself is **placed** in the at least one selected bit position of the value. For example, if the information 1 0 is to be placed in the second and third bit position of the average value, the average value is adjusted so that its second bit has a value of 0 and its third bit has a value of 1. What this does is to facilitate the extraction of the information, because once one knows which bit position(s) of the value contains the additional information, one can immediately directly see it, and simply copy the specified bit(s) in order to extract the additional information. Continuing the example above, one can simply look at the second and third bit of the average value and see that it is 1 0, and thus know the additional information embedded thereat is 1 0.

However, **no** such placement is taught or suggested by Reed et al. Rather, Reed et al. uses the block's characteristic color, which is the average color over the whole block, as noted above, and **not** the average of any particular one color channel and **not** the average of a chrominance signal, only to look up the color channel(s) in which the watermark is expected to be encoded and to decode the watermark from those color channel(s). (See Reed et al., column 38, lines 48-51).

It is clear then, that, notwithstanding the Office Action's statements to the contrary, applicant's claims do **not** recite simply using selected bits of the block to carry the watermark. In fact, according to applicant's claim, the bits employed to carry the watermark data are bits of a value derived from an average of a chrominance portion of

the block. Such an average value is computed from the values of the chrominance portion for each pixel in the block.

Thus, applicant's previously presented arguments, repeated hereinbelow, are correct, and applicant's claims are allowable over Reed et al. under 35 U.S.C. 102.

Reed et al. does **not** teach to place the bits of watermark data into at least one selected bit of an average value of a chrominance portion over a block of the video signal, as required by applicant's independent claim 1. Rather, Reed et al. teaches employing the average color of the block to look up the corresponding color channels in which to embed the additional data. (See Reed et al. column 2, lines 40-52, column 38, lines 10-47.) However, in Reed et al., the additional information is **not** encoded so that it is carried by the average value, as required by applicant's claims. Furthermore, the modifications of the image to add thereto the watermark data by Reed et al. do not place the actual bit values of the watermark data into at least one selected bit of the average value of the chrominance potion of a block. (Again, see Reed et al. column 2, lines 40-52, column 38, lines 10-47.)

Similarly, Reed et al. does **not** teach adding information to pixels of the block of the video signal to thereby cause a change in the average value of a selected chrominance portion so as to incorporate at least a portion of additional watermarking data within a changed average value, as required by applicant's independent claims 23, 34, 53, 54, 57, and 58. This is because, as mentioned, in Reed et al., the additional information is not encoded so that it is carried by the average value.

Note that lines 29-36 of column 15 of Reed et al., cited by the Office Action in support of its position, do not teach that for which they are set forth by the Office Action. Rather, these lines appear to teach that the message inserted may be multiple bits or as small as a single bit. They do **not** teach that such bit is inserted in an average of the chrominance portion. Similarly, column 2, lines 50-51, of Reed et al., appears to teach along the lines of that which was mentioned above, namely, that the average color of the block is used to look up the corresponding color channels in which to embed the block. But again, it does **not** teach that the additional information is encoded so that it is carried by the average value, or even the average color.

Regarding independent claims 38, 50, 55, 56, and 58 which are directed to recovering the watermark data from a watermarked video signal, these claims extract the watermark data from the average value of one of the chrominance portions. Since Reed et al. does **not** place watermark data in the average value of any of chrominance portions, Reed et al. can**not** recover watermark data from the average value of any of chrominance portions. Consequently, independent claims 38, 50, 55, 56, and 58 are allowable over Reed et al.

Since all of the dependent claims that depend from the currently amended independent claims include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Reed et al. under 35 U.S.C. 102.

Rejection Under 35 U.S.C. 103(a)

Claims 10, 12, 19, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. in view of various other references.

Each of these grounds of rejection applies only to dependent claims, and each is predicated on the validity of the rejection under 35 U.S.C. 102 given Reed et al. Since the rejection under 35 U.S.C. 102 given Reed et al. has been overcome, as described hereinabove, and there is no argument put forth by the Office Action that any of the additional references supplies that which is missing from Reed et al. to render the independent claims anticipated, these grounds of rejection cannot be maintained.

Therefore, applicant's claims 10, 12, 19, and 33 are allowable over Reed et al. under 35 U.S.C. 103(a).

Conclusion

It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, he is invited to call applicant's attorney so that arrangements may be made to discuss and resolve any such issues.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to the **Alcatel-Lucent USA Inc. Deposit Account No. 12-2325.**

Respectfully,

M. H. Zarrabizadeh

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